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COUNSELING OF FLUOROSIS, UTILIZATION, AND CLEARANCE OF FLUOR IN WATER, DESA MOJOSARI KECAMATAN ASEMBAGUS KECAMATAN SITUBONDO

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Abstrak: Fluorosis gigi merupakan suatu kelainan struktur email bercak atau cacat (*mottled enamel*) sebagai dampak dari asupan fluor berlebih pada masa pembentukan gigi. Air merupakan salah satu sumber fluor. Tujuan dari pengabdian kepada masyarakat ini adalah untuk membantu masyarakat dalam meningkatkan kesehatan gigi dan mencegah fluorosis gigi dan tulang. Pelaksanaan Pengabdian kepada masyarakat ini menggunakan metode ceramah dan diskusi. Tahapan pengabdian ini meliputi *pretest,* penyampaian materi, *post test* , dan sesi diskusi. Hasil *post test* menunjukkan adanya peningkatan pengetahuan masyarakat. Peningkatan pengetahuan ini diharapkan dapat diterapkan oleh masyarakat desa Mojosari dalam upaya pengadaan air guna memenuhi kebutuhan hidupnya.

Kata Kunci: fluor, fluorosis, desa Mojosari

***Abstract**: Dental fluorosis is a disorder of mottled or mottled enamel structure as a result of excess fluoride intake during tooth formation. Water is one source of fluorine. The purpose of this community service is to assist the community in improving dental health and preventing dental and bone fluorosis. The implementation of this community service uses lecture and discussion methods. The stages of this service include pretest, delivery of material, post test, and discussion sessions. Post test results show an increase in community knowledge. It is hoped that this increase in knowledge can be applied by the Mojosari village community in an effort to procure water to meet their needs.*

***Keywords**: fluorosis, fluorosis, Mojosari village*

Introduction

Humans need water for various purposes such as bathing, cooking and most importantly for daily consumption (Pradana, Y.A, 2013). The need for water is absolute for humans because it is the substance that forms the largest human body, namely 685 of the human body. The need for drinking water for each person varies from 2.1 liters to 2.8 liters per day (Rahayu, C.S et al, 2013). Water and health are two things that are interconnected.

The quality of water consumed by the community can determine the health status of the community, especially water for drinking and eating (Agmalia, D et al, 2013). Apart from being an essential need, drinking water also has the potential to be a medium for disease transmission, poisoning and so on (Mujianto, B et al, 2015).

Water is a very important component for life, especially as a source of drinking water. Water used as a source of drinking water must be of good quality, in accordance with the Regulation of the Minister of Health of the Republic of Indonesia Number 492/MENKES/PER/IV/2010 concerning drinking water quality requirements. Clean water used by the community is said to be safe if it fulfills the physical, chemical, bacteriological and radioactive requirements. One of the mandatory parameters directly related to human health is the inorganic chemical content in drinking water. Fluoride (F^-) is an inorganic anion that enters this parameter (Republic of Indonesia's Health Department, 2010).

Water is a source of high fluoride intake. Thus, the level of fluoride in the water used for consumption must be considered so as not to overdo it. Drinking water with fluoride levels of ± 0.4 ppm in tropical areas can already cause fluorosis, associated with higher water consumption compared to cold climates (Astriningrum, Y, 2010 et al).

One of the most abundant sources of fluoride intake in humans is drinking water, especially from groundwater. The fluorine content in drinking water samples is affected by such as the availability and solubility of fluorine-containing minerals, the porosity of the rock or soil through which the water passes other elements, for example calcium, aluminum and iron, which can combine with fluorine. (Ambarkova.,V, et all, 2007). Elemental fluorine in fluorine-enriched minerals dissolves gradually in groundwater, and becomes one of the main elements. In general, the mineral fluorides are sparingly soluble in water. Free fluoride is unstable and does not play a role in toxicology because it reacts quickly from fluoride compositions.

The presence of dissolved fluoride is possible only under favorable physico-chemical conditions and when the residence time is sufficiently long. Of all fluoride-rich minerals, fluorite is most abundant and occurs in almost all detrital rocks and minerals. Chemically, fluoride and the OH ion are negatively charged and also have nearly the same ionic size. hence, during chemical reactions, fluoride can easily replace OH ions in many rocks that form minerals. In the process of weathering, hydrolysis, dissociation and dissolution occur over time. This fluoride is needed at an appropriate level to prevent dental caries, but if it is excessive it can cause dental fluorosis to skeletal fluorosis in exposure to fluoride with very high levels and for a long time. Epidemiological studies in China showed a relationship between fluoride intake and dose response where it was found that there was fragility of bones and teeth at very low fluoride intakes and at very high fluoride intakes (Jawell J. et al., 2006).

Fluoride is a very reactive halogen, therefore in nature it is always found in the form of compounds. Inorganic fluorides are toxic and more irritant than organic ones. Chronic poisoning causes people to become emaciated, body growth is disturbed, dental and skeletal fluorosis occurs and digestive disorders which can be accompanied by dehydration. In cases of severe poisoning will occur deformed bones, paralysis and death. From previous recent research on fluoride compounds in rats, it was shown that there was a significant relationship between fluoride and bone cancer (Agmalia, D et al, 2013). At a smaller

concentration of 1.5 ppm fluoride is very beneficial for dental health. On concentration greater than 2 ppm can cause tooth decay. Fluoride at a concentration of 3 -6 ppm can cause damage to the bone structure (Aziz. T, et all, 2013).

The idea of implementing this Community Service originated from the results of a survey by volunteers while conducting research in Mojosari village, Asembagus sub-district, Situbondo Regency. Researchers found that most of the people in Mojosari village had teeth with yellow spots. Such teeth are a symptom of fluorosis. Fluorosis is a disease caused by excess fluoride with initial symptoms of yellowish spots on the teeth (Wirza et al., 2018). The servant feels the need to convey knowledge about fluorosis to the community in Mojosari Village, Asembagus District, Situbondo Regency through community service activities. Based on the foregoing community service with the title "Educational Fluorosis, Utilization, and Fluorine Purification in Water" really needs to be done.

Method

The implementation of Community Service uses interactive lecture and discussion methods. This service was held on Thursday 2 May 2019 at the Asembagus Village Hall which was attended by 36 people.

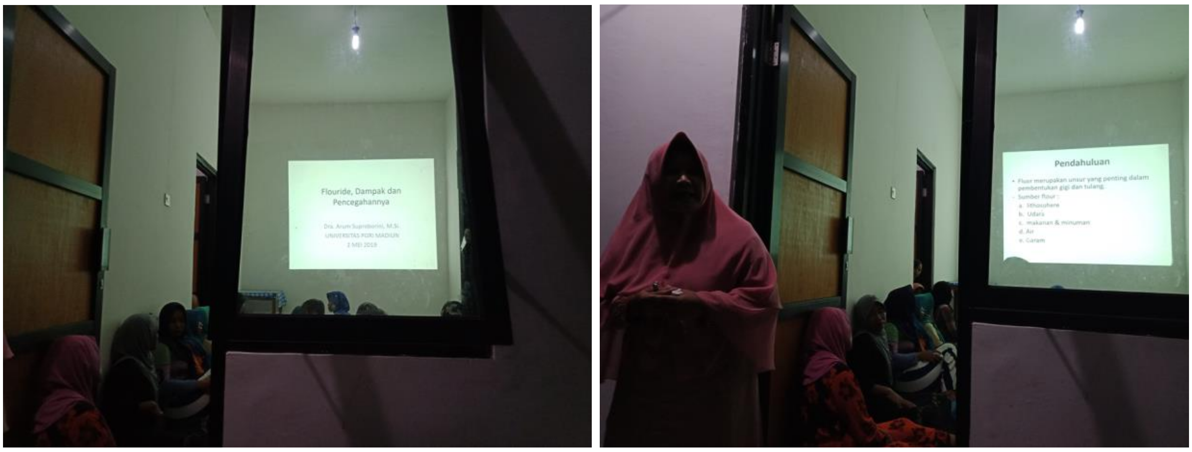
Results And Discussion

Community service has been carried out in the presence of the Mojosari village community. The volunteers started the activity by holding a pre-test by distributing questionnaires containing questions about fluoride, fluorosis, fluoride utilization, and how to clean fluoride in water. This pretest is intended to determine the participants' initial knowledge level about fluoride. From the results of the pretest, 13 participants received a score of 5; 17 participants who scored 6; there were 4 participants who scored 7; and 2 participants who got 8. The percentage of pre-test results were: a value of 5 was 36.1%; value 6 is 47.2%; value 7 is 11.1% and value 8 is 5.6%.

The servant then delivered material about fluoride, fluorosis, utilization and clarification of fluoride in water. Furthermore, the servant conducted a postest by distributing more questionnaires to find out the level of knowledge of the participants after receiving socialization about fluorosis. The results of the post test showed that there was an increase in the participants' knowledge. This can be seen from the value obtained by the participants. The results of the postest are as follows: there were 4 participants who got a score of 6; 23 participants scored 7; and 5 participants got a score of 8, and 4 participants got a score of 9. The percentages of the post test results are as follows: a score of 6 is 11.1%; value 7 is 63.9%; value 8 is 13.9% and value 9 is 11.1%.

The training participants looked very enthusiastic in participating in the activity from the beginning of the event to the end of the activity. This can be seen from the number of questions asked by the participants. Among the questions are: why do we need fluoride, what is the impact if we lack or excess fluoride. Resource person Mrs. Dra. Arum Supborini, M.Sc. provides an explanation that fluoride is needed by our body in the required amount. According to the Regulation of the Minister of Health of the Republic of Indonesia Number 28

of 2019 concerning the recommended nutritional adequacy rate for Indonesian people divided into several age groups. Fluorine requirement for children aged 7-9 years is 1.4 mg; adult male 4 mg; and adult women is 3 mg. Furthermore, the source added that fluorine plays a role in inhibiting caries in the oral environment through a demineralization mechanism, through the formation of an acid-fast phase and increase enamel remineralization for teeth that have not experienced caries and have not had cavities (Anusative K., 2004). Fluorine has three roles, namely in the formation of tooth enamel by the formation of fluor apatite so that it makes teeth more resistant to demineralization by acids from bacteria, affects bacterial metabolism, besides that it influences the formation of polysaccharides in cells which are used as reserves to produce acid, adds or stimulates remineralization which will stop the caries process from taking place (Indriawati S and Rantinah SBS, 2007).



Picture 1. Submission of socialization materials

Furthermore, the presenter explained the consequences if a daily fluoride deficiency can cause tooth decay such as caries on the teeth, discolored teeth in children, thinning bones, to osteoporosis (Titian P., 2009). This daily fluoride deficiency can cause tooth decay such as caries on the teeth, discolored teeth in children, thinning bones, to osteoporosis. This fluoride deficiency can be overcome by consuming additional fluoride from sources other than drinking water. Meanwhile, excessive levels of fluoride in the body can result in dental fourosis to skeletal fluorosis in very high fluoride exposure and for a long time (Fawell J. et al., 2006).



Picture 2. Focus Group Discussion (FGD)

One of the participants asked by showing his teeth, are my teeth like this also caused

by excess fluoride, ma'am? accompanied by the laughter of the other participants. The resource person was happy to explain by first asking if you had lived in Mojosari village for a long time? The mother was apparently born in Mojosari. Furthermore, the resource person, Dra. Arum Suproborini, M.Sc. explained that dental fluorosis is an abnormality of mottled enamel structure as a result of excessive fluoride intake during tooth formation. Changes that appear due to excessive consumption of fluoride in early childhood when the teeth are growing. Dental fluorosis is characterized by brown stains or yellow spots that spread over the surface of the teeth due to imperfect tooth enamel formation. This imperfect tooth enamel causes cavities easily, white and brown spots appear on the teeth (Titian P., 2009). Furthermore, the speaker explained how to clear/reduce the fluoride content in water, namely by utilizing Moringa seeds.

Moringa seeds can be used as a coagulant because these seeds contain an active substance in the form of 4α-4r rhamnosyloxy-benzyl-isothiocyanate which functions as a cationic protein that is able to adsorb and neutralize sludge particles and metal water in wastewater or turbid water. This active substance can help reduce the repulsive force between colloidal particles in water, so that it can be used as a coagulant in water treatment processes (Rambe, 2009). Moringa seeds contain proteins which are cationic polyelectrolytes which can be used to purify water, these proteins contain amino acids which, when dissolved in water, will ionize or dissociate (Poejiati, 1994). In a study conducted by Hidayat S (2009) the moringa seed coagulant used was in powder form which was obtained by drying in an oven for 30 minutes at 105 °C, which aims to homogenize and reduce the water content. After drying, the moringa seeds are ground to powder, the purpose of this refinement is so that the moringa seed powder easily forms flocs when added to the leather textile industry wastewater. The color of the moringa seeds changes with the drying process, from white to light brown.

Community service activities end with a friendly event and enjoy a meal together. The servant hopes that the community service activities that have been carried out can become useful knowledge. The servant also hopes that the public can prevent fluorosis in future generations by consuming drinking water that meets the nutritional adequacy standards of the community as recommended by the Ministry of Health of the Republic of Indonesia.

Conclusion

The community service implementation was carried out at the Mojosari Village Hall, Asembagus Subdistrict, Situbondo Regency, which was attended by 36 people. It is hoped that this increase in community knowledge can be applied by the community in an effort to fulfill their need for water. The residents of Mojosari village should now switch to consuming water whose fluoride content meets the requirements set for drinking and cooking water.

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